

## New Species of Pycnogonida from Waters Adjacent to Japan

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**ABSTRACT**—Two new species of Pycnogonida from Sagami Bay, Japan, are described: *Nymphon quadriclavus* and a female *Anoplodactylus imperialis*, which belong to the collections of the Biological Laboratory, Imperial Household. A male *A. imperialis* was later collected east of Shimoda, Izu Peninsula. Their relationships to known species are discussed.

### INTRODUCTION

There are many reports on Pycnogonida from waters of Sagami Bay, Japan, as reviewed in Nakamura and Child [1]. This paper describes two additional new species from Sagami Bay: One species, *Nymphon quadriclavus*, was found in the collections of the Biological Laboratory, Imperial Household (BLIH). The other is *Anoplodactylus imperialis*, a female of which was reported as *Anoplodactylus* species in Nakamura and Child [1]. A male of this species was collected from east of Izu Peninsula, and one female was found in the collections of BLIH. Adding these 2 species, a total of 99 species of 27 genera have been recorded from Japanese waters. Among them, 69 species of 21 genera, including 12 out of 13 species of *Anoplodactylus*, were collected from Sagami Bay, making it the best studied area for the pycnogonid fauna in Japan.

Some types are deposited in the collections of the Biological Laboratory, Imperial Household and the others in those of the National Museum of Natural History, Smithsonian Institution, under the catalog numbering system of the United States National Museum.

### *Nymphon quadriclavus* new species (Figs. 1 and 2)

*Nymphon ortmanni*, Utinomi, 1971: 320, (*nec* Helfer, 1938).

*Material examined*: Sagami Bay, 6.5 km off northwest-by-west of Jogashima Islet, 450 m. Jul. 13, 1963. (1 ♂ holotype, 1 juvenile allotype, BLIH No. 82).

*Description*: Animal large, leg span about 61 mm. Trunk elongate, segments swollen, completely segmented. Lateral processes almost twice as long as and separated by one and one-half times their diameter, unarmed. Neck moderately long, about four times its diameter, with bulge at chelifore insertions. Ocular tubercle low, not taller than wide, rounded, having two small lateral papillae, placed above oviger implantation. Eyes large, well pigmented. Abdomen moderately long, carried at about a 45 angle. Proboscis cylindrical, rounded distally.

Chelifore large, slender. Scape long, almost eight times longer than its diameter, armed with several dorsal, lateral and distal setae. Chela palm about four times as long as its diameter, armed with many setae. Fingers almost the same length as palm, slightly curved proximally, well curved at overlapping tips. Immobile finger armed with 29 or 30 long sharply pointed teeth, movable finger with 40 or 41 similar teeth.

Palp first segment only slightly longer than wide,

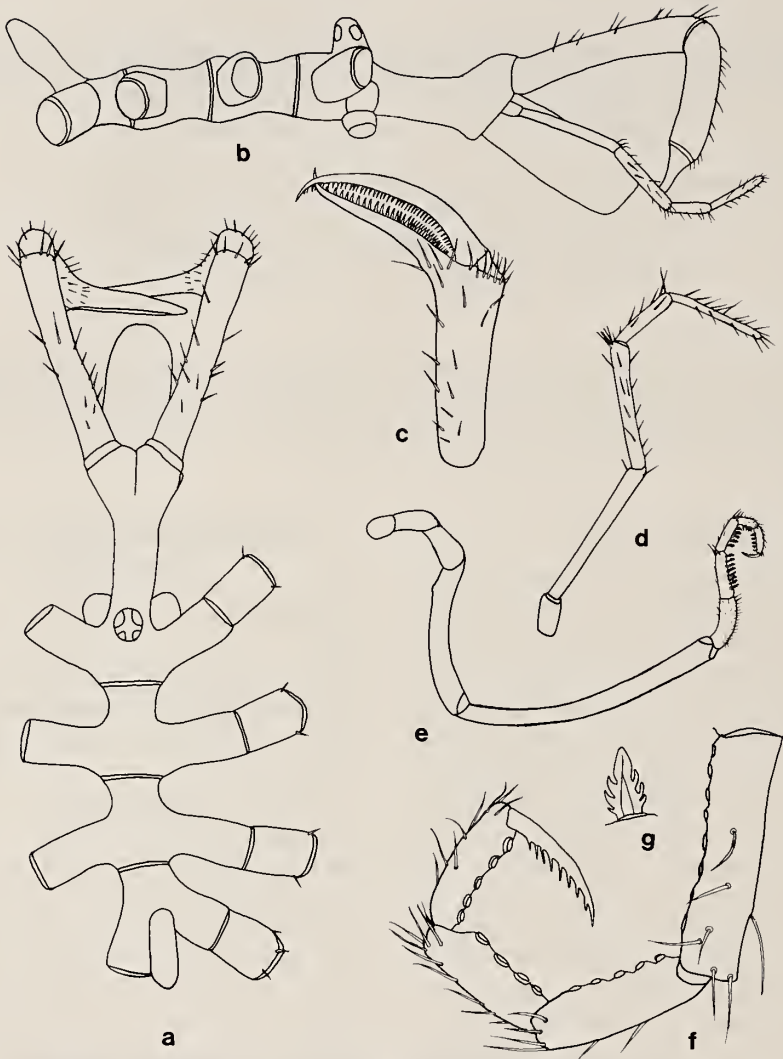


FIG. 1. *Nymphon quadriclavus*, new species, holotype, male: a, trunk, dorsal view ( $\times 16$ ); b, trunk, lateral view ( $\times 16$ ); c, chela ( $\times 20$ ); d, palp ( $\times 20$ ); e, oviger ( $\times 4.5$ ); f, strigilis of oviger ( $\times 55$ ); g, compound spine of oviger ( $\times 150$ ).

second longest, armed with distal setae. Third about four-fifths length of second, slightly longer than fifth, fourth two thirds length of fifth. Each of terminal three segments armed with many ventral and distal setae.

Oviger insertion touching anterior of first lateral process. First segment globular, second and third subequal in length. Fourth, almost half length of fifth, with small proximal bump. Fifth longest, armed with few distal setae. Fourth and fifth slightly curved. Sixth almost one-fifth length of

fifth segment, armed with many setae. Strigilis with several ectal and longer distal setae, with endal denticulate spines in formula 8:5:4:5. Denticulate spines with 3 lateral serrations. Terminal claw long, as long as terminal segment, moderately curved, with 8 sharp endal teeth.

Legs long, slender. Second coxa almost twice longer than first and third combined. Femur shorter than tibia 1. Tibia 2 longest, almost one and half length of tibia 1. Each tibiae armed with many short setae. Cement glands with 4 short tubes,

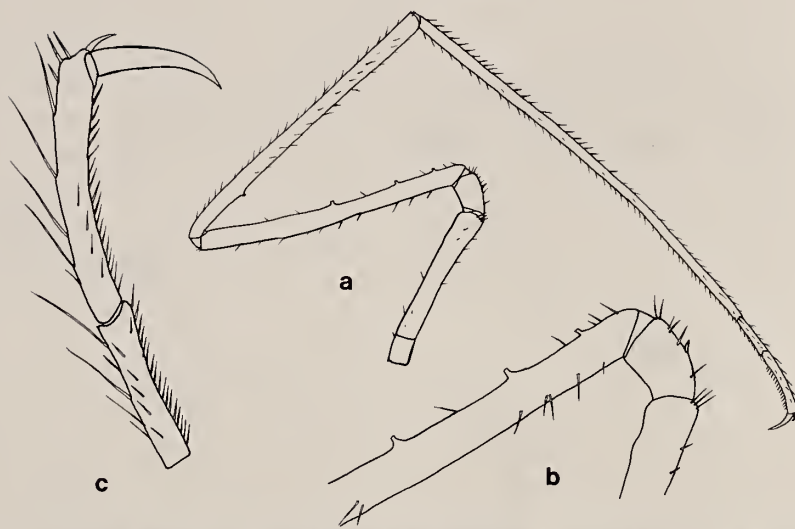


FIG. 2. *Nymphon quadriclavus*, new species, holotype, male: a, third leg ( $\times 4.5$ ); b, third coxa and proximal femur ( $\times 9$ ); c, terminal segments of third leg ( $\times 23$ ).

three placed ventrally on femur, one at proximoventral one-fifth of tibia 1. Tarsus of the brevitarsal group, slightly over half length of propodus. Propodus sole spines short, numerous. Claw slightly curved at tip, about half length of propodus. Auxiliaries tiny, less than one-fourth length of main claw: Measurements of holotype (mm). Trunk length, 3.64; trunk width across 2nd lateral process, 2.17; proboscis length, 1.38; abdomen length, 0.82; fourth leg, coxa 1, 0.61; coxa 2, 2.82; coxa 3, 0.98; femur, 5.54; tibia 1, 6.68; tibia 2, 9.84; tarsus, 0.9; propodus, 1.48; claw, 0.65.

*Remarks:* Among the many *Nymphon* species inhabiting the rim of north Pacific Ocean, *Nymphon quadriclavus* appears to be most closely related to *Nymphon ortmanni* Helfer, 1983 [2] and Utinomi had identified these specimens as *N. ortmanni* [3]. The most conspicuous character is the cement glands of new species which are small, tube-like, and exist three on the femur and one on the tibia 1 of all legs, while the cement glands of *N. ortmanni* are 25–30 small pores in a line on the ventral side of each femur. The oviger of the new species has denticule spines which are only slightly taller than wide. Those of *N. ortmanni* are longer and more slender. The number of teeth of the oviger terminal claw is eight in the new species while that of *N. ortmanni* is 5–6.

The species is named for its characteristic cement glands.

*Anoplodactylus imperialis* new species  
(Fig. 3)

*Anoplodactylus* species Nakamura and Child, 1983: 54, fig. 18.

*Material examined:* Sagami Bay, 1.5 km off west of Kamekisho, 60 m. Jul. 15, 1963. (1♀ paratype, BLIH No. 109). 34°41.2'N, 139°00.2'E, 50 m. Jul. 14–16, 1969. (1♀, 1 juvenile paratypes, USNM 195233). 34°39.9'N, 139°00.4'E–34°39.7'N, 138°59.8'E, 68–60 m. Nov. 9, 1981. (1♂ Holotype, USNM 228752).

*Description:* Animal of moderate size, leg span 27.5 mm. Trunk elongate, without segmentation. Lateral processes slender, moderately long, over twice longer than their diameters, separated by more than their diameters, without tubercles. Neck moderately short. Ocular tubercle a truncated cone, almost as tall as basal width, with lightly pigmented eyes. Proboscis long, swollen at midlength. Abdomen short, erect, tapering, glabrous.

Chelifore scape slender with slight ventral curve, armed with distal setae. Chela large, fingers overlapping at tips, movable finger with three, immov-

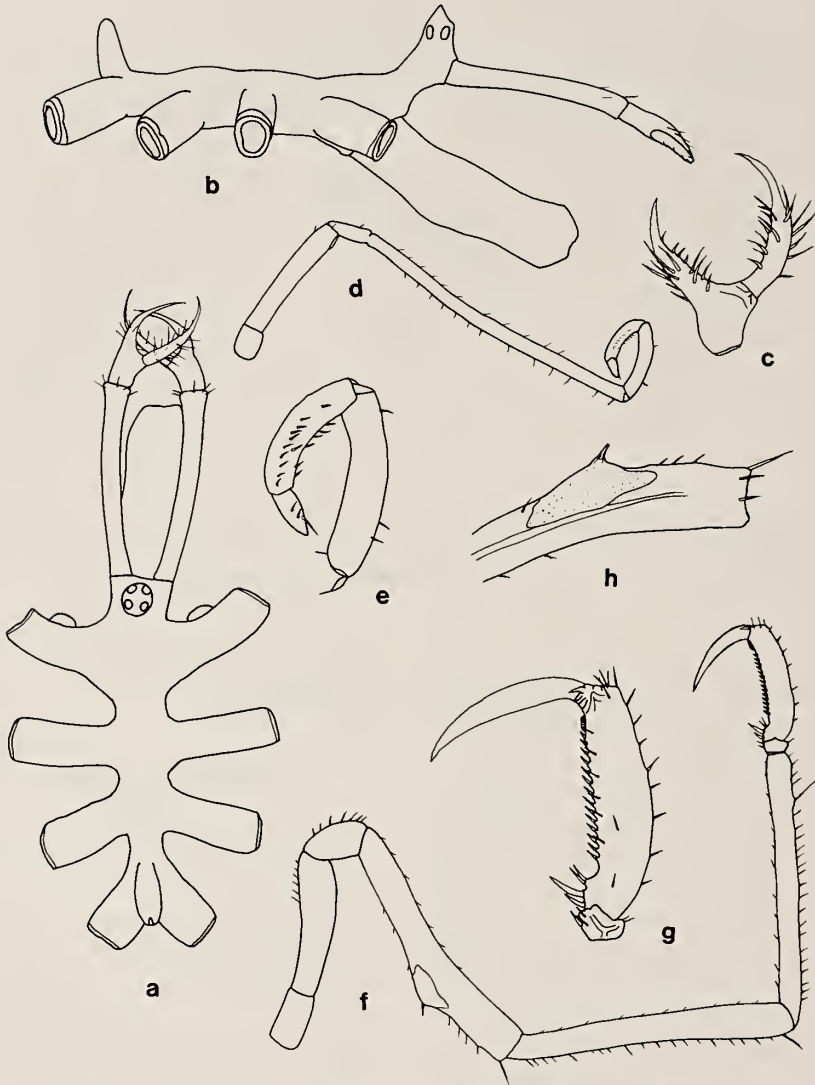


FIG. 3. *Anoplodactylus imperialis*, new species, holotype, male: a, trunk, dorsal view ( $\times 18$ ); b, trunk, lateral view ( $\times 18$ ); c, chela ( $\times 31$ ); d, oviger ( $\times 17$ ); e, terminal segments of oviger ( $\times 43$ ); f, third leg ( $\times 13$ ); g, terminal segments of third leg ( $\times 26$ ); h, distal part of femur ( $\times 20$ ).

able finger with four teeth. Fingers armed with more than ten setae each.

Oviger 6-segmented, very long, third segment longest, almost two and a half times length of second, with proximal constriction, armed with ectal and endal setae rows, setae shorter than segment diameter. Fourth segment almost as long as fifth and sixth combined, terminal segment conical, armed with several short setae.

Legs moderately slender, first coxa almost as long as third. Second coxa longer than combined length of first and third. Femur equal to tibia 2, tibia 1 longest segment, all armed with dorsal setae. Femoral cement gland, a truncate tube with swollen base, situated distally of femur dorsal midpoint. Tarsus almost rectangular, armed with two dorsal setae and several ventral setae. Propodus long, slightly curved, with low heel bearing

two stout spines, distal one twice size of proximal spine, and two stout lateral setae. Sole straight, armed with 15 or more small spines, and very short lamina. Claw long, almost the same length of sole of propodus. Auxilliary claws tiny. Measurements of holotype (mm). Trunk length, 2.95; trunk width across 2nd lateral process, 1.93; proboscis length, 1.73; abdomen length, 0.4; third leg, coxa 1, 0.59; coxa 2, 1.4; coxa 3, 0.68; femur, 2.58; tibia 1, 2.75; tibia 2, 2.58; tarsus, 0.2; propodus, 1.14; claw, 0.83.

*Remarks:* As pointed out by Nakamura and Child [1], this is a relatively large species for *Anoplodactylus*. *Anoplodactylus iuleus* Stock from tropical Atlantic is closely related to and is as large as this new species [4], but different in having a lower ocular tubercle, single heel spine and longer lamina on the propodus, and fewer teeth on each chela finger. Comparing the holotype male with *A. iuleus*, there are such differences as the location of the femoral cement gland (more distal in the new species), and the relative length of terminal three segments of the oviger (the terminal two are longer in the new species).

This species is named for the Biological Laboratory, Imperial Household.

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#### REFERENCES

- 1 Nakamura, K. and Child, C. A. (1983) Shallow-water Pycnogonida from the Izu Peninsula. *Smithsonian Contrib. Zool.*, **386**: 1-71.
- 2 Helfer, H. (1938) Einige neue Pantopoden aus der Sammlung des Zoologischen Museum in Berlin. *Sitzungsber. Ges. Naturforsch. Freude zu Berlin*, **1937**: 162-185.
- 3 Utinomi, H. (1971) Records of Pycnogonida from shallow waters of Japan. *Publ. Seto Marine Biol. Lab.*, **18**: 317-347.
- 4 Stock, J. H. (1975) Pycnogonida from the Continental Shelf, Slope, and Deep Sea of the Tropical Atlantic and East Pacific. *Biological Results of the University of Miami Deep-Sea Expeditions*, 108. *Bull. Marine Sci.*, **24**: 957-1092.